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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,092	01/14/2004	Ted Johansson	068758.0157	3525

7590 06/22/2004
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EXAMINER

LUK, OLIVIA T

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 06/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

602

Office Action Summary

Application No.

10/757,092

Applicant(s)

JOHANSSON ET AL.

Examiner

Olivia T Luk

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-32 is/are allowed.
- 6) ☒ Claim(s) 1, 6-13, 15 and 16 is/are rejected.
- 7) ☒ Claim(s) 2-5, 14 and 17-22 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 6-13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being obvious over Norstrom (6,077,752) in view of Johnson (5,616,508).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or

Art Unit: 2812

subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

In re claim 1, Norstrom discloses forming a layer of amorphous silicon on a substrate of monocrystalline silicon or on a substrate at least comprising a surface layer of monocrystalline silicon (col. 3, lines 20-25), depositing at least one dielectric layer on the amorphous silicon layer so as to prevent crystallization of the amorphous layer (col. 3, lines 28-30); patterning the resultant structure (col. 3, lines 48-50), and etching the dielectric layer and the amorphous silicon layer within a predetermined region (col. 3, lines 55-57); and heat-treating the resultant structure subsequent to etching so as to crystallize the amorphous layer (col. 6, lines 35-39), but fails to specifically teach the amorphous silicon layer is silicon-germanium.

Johnson teaches that silicon-germanium is commonly used on monocrystalline silicon and patterned and etched in a bipolar transistor (col. 3, lines 58-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form amorphous silicon-germanium in the bipolar transistor as the amorphous silicon since it is well known in the art.

In re claim 6, Norstrom in view of Johnson is applied supra, further disclosing the amorphous silicon-germanium layer is doped (col. 6, lines 10-11).

In re claim 7, Norstrom in view of Johnson is applied supra, further disclosing the amorphous silicon-germanium layer is doped by ion implantation, preferably with B or BF₂ (col. 4, lines 30-32).

In re claim 8, Norstrom in view of Johnson is applied supra, further disclosing the amorphous silicon-germanium layer is doped simultaneously as it is formed on the substrate (col. 5, lines 25-35).

In re claim 9, Norstrom in view of Johnson is applied supra, further disclosing the amorphous silicon-germanium layer is formed on the substrate by using any one of the techniques CVD, RP-CVD, UHV-CVD and MBE (col. 3, lines 20-25).

In re claim 10, Norstrom in view of Johnson is applied supra, further disclosing the dielectric layer is deposited by any one of the techniques PE-CVD, SA-CVD, HDP-CVD, MBE or a spin-on technique (col. 3, lines 35-40).

In re claim 11, Norstrom in view of Johnson is applied supra, further disclosing the dielectric layer is a TEOS (col. 3, line 39).

In re claim 12, Norstrom in view of Johnson is applied supra, further disclosing the dielectric layer is deposited at a temperature of between 250 and 400°C (col. 3, line 46).

In re claim 13, Norstrom in view of Johnson is applied supra, further disclosing the amorphous silicon-germanium layer is etched within a predetermined region using a fluorine-or chlorine-based chemistry (col. 3, lines 55-58).

In re claim 15, Norstrom in view of Johnson is applied supra, further disclosing the substrate of monocrystalline silicon is p-type doped, particularly with boron, and/or contains germanium (col. 4, lines 65-67).

In re claim 16, Norstrom in view of Johnson is applied supra, further disclosing the etching of the amorphous silicon-germanium layer within the predetermined region is a dry etching process and wherein end-point detection of germanium is performed during the dry

Art Unit: 2812

etching process to control the etching of the amorphous silicon-germanium layer (col. 3, lines 50-60).

Allowable Subject Matter

3. Claims 2-5, 14, 17-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. Claims 23-32 are allowed.

5. The following is a statement of reasons for the indication of allowable subject matter: Prior art of record fails to disclose the method of manufacturing a bipolar transistor having a self-registered base emitter structure wherein the substrate includes a buried collector and an epitaxially formed base surrounded by isolation regions in addition to forming the amorphous silicon-germanium layer and patterning and etching as claimed.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References not applied are considered state of the art in the area of semiconductor manufacture.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olivia T Luk whose telephone number is 571-272-1676. The examiner can normally be reached on 7AM to 4PM Mon-Fri.

Art Unit: 2812

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 571-272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

OTL
June 17, 2004


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800